Tactical Combat Casualty Care

(A new way to Triage & Treat Injured Soldiers)

Introduction

- Soldiers continue to die on today's battlefield just as they did during the Civil War. The standards of care applied to the battlefield have always been based on civilian care principals. These principals while appropriate for the civilian community often do not apply to care on the battlefield.

Introduction

Civilian medical trauma training is based on the following principles:

Emergency Medical Technicians (EMT-B,I,P)

Basic Trauma Life Support (BTLS)

Advanced Trauma Life Support (ATLS)

Introduction

- Tactical Combat Casualty Care has been approved by the American College of Surgeons and National Association of EMTs and is included in the Pre-hospital Trauma Life Support manual 5th edition.

Introduction

- This approach recognizes a particularly important principle –
- Performing the correct intervention at the correct time in the continuum of combat care. A medically correct intervention performed at the wrong time in combat may lead to further casualties

Introduction

- Three goals of TCCC:
  - ✓ 1. Treat the casualty
  - ✓ 2. Prevent additional casualties
  - ✓ 3. Complete the mission

Introduction

- Pre-hospital care continues to be critically important
- Up to 90% of all combat deaths occur before a casualty reaches a Medical Treatment Facility (MTF)
- Penetrating vs. Blunt trauma

Combat Deaths

- KIA: 31% Penetrating head trauma
- KIA: 25% Surgically uncorrectable torso trauma
- KIA: 10% Potentially surgically correctable trauma
- KIA: 9% Hemorrhage from extremity wounds
- KIA: 7% Mutilating blast trauma
- KIA: 5% Tension pneumothorax
- KIA: 1% Airway problems
- DOW: 12% Mostly from infections and complications of shock

Factors Influencing Combat Casualty Care

- Enemy Fire
- Medical Equipment Limitations
- Widely Variable Evacuation Time
- Tactical Considerations
- Casualty Transportation

STAGES OF CARE

- Care Under Fire
- Tactical Field Care
- Combat Casualty Evacuation Care

Care Under Fire

- “Care under fire” is the care rendered by the medic at the scene of the injury while he and the casualty are still under effective hostile fire. Available medical equipment is limited to that carried by the soldier or the medic in his aid bag.

Tactical Field Care

- “Tactical Field Care” is the care rendered by the medic once he and the casualty are no longer under effective hostile fire. It also applies to situations in which an injury has occurred, but there has been no hostile fire. Available medical equipment is still limited to that carried into the field by medical personnel. Time to evacuation to a MTF may vary considerably.

Combat Casualty Evacuation Care

- “Combat Casualty Evacuation Care” is the care rendered once the casualty has been picked up by an aircraft, vehicle or boat. Additional medical personnel and equipment may have been pre-staged and available at this phase of casualty management.

Care Under Fire

Manage Apparent Life Threats:

- Protect casualty from further injury
- Stop injury process
- Control severe bleeding

Care Under Fire

Care Under Fire

- Medical personnel's firepower may be essential in obtaining tactical fire superiority. Attention to suppression of hostile fire may minimize the risk of injury to personnel and minimize additional injury to previously injured soldiers.

Care Under Fire

- Personnel may need to assist in returning fire instead of stopping to care for casualties

- Wounded soldiers who are unable to fight should lay flat and motionless if no cover is available or move as quickly as possible to any nearby cover

Care Under Fire

- Medical personnel are limited and if injured no other medical personnel may be available until the time of extraction during the CASEVAC phase

- No immediate management of the airway is necessary at this time due to movement of the casualty to cover

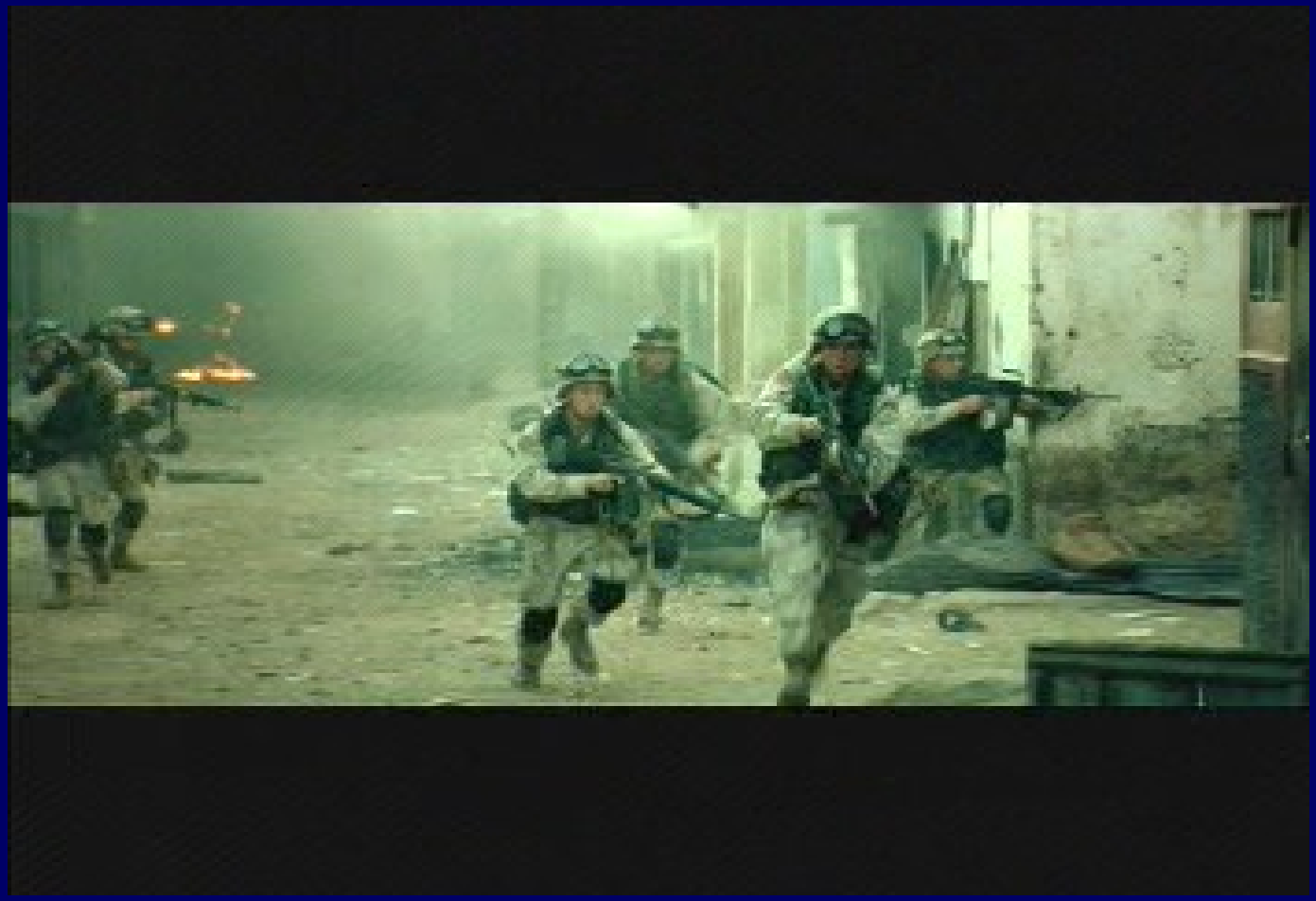
Care Under Fire

- Control of hemorrhage is important since injury to a major vessel can result in hypovolemic shock in a short time frame
- Over 2500 deaths occurred in Viet Nam secondary to hemorrhage from extremity wounds

Care Under Fire

- Use of temporary tourniquets to **stop the bleeding** is essential in these types of casualties

Care Under Fire



Tourniquet

Care Under Fire

The need for immediate access to a tourniquet in such situations makes it clear that all soldiers on combat missions have a suitable tourniquet readily available at a standard location on their battle gear and be trained in its use.

Care Under Fire

- Penetrating neck injuries do not require C-spine immobilization. Other neck injuries, such as falls over 15 feet, fast-roping injuries, or MVAs may require C-spine control **unless** the danger of hostile fire constitutes a greater threat in the judgment of the medic

Care Under Fire

- Conventional litters may not be available for movement of casualties. Consider alternate methods to move casualties such as a SKED® or Talon II® litter. Smoke, CS, and vehicles may act as screens to assist in casualty movement.

Care Under Fire

- Do not attempt to salvage a casualty's rucksack, unless it contains items critical to the mission

- Take the patient's weapon and ammunition if possible to prevent the enemy from using it against you.

KEY POINTS

- Return fire as directed or required
- The casualty(s) should also return fire if able
- Try to keep yourself from being shot
- Try to keep the casualty from sustaining any additional wounds
- Airway management is generally best deferred until the Tactical Field Care phase
- Stop any life threatening hemorrhage with a tourniquet
- Reassure the casualty

Tactical Field Care

Tactical Field Care

- The Tactical Field Care phase is distinguished from the Care Under Fire phase by having more time available to provide care and a reduced level of hazard from hostile fire. The times available to render care may be quite variable.

Tactical Field Care

- In some cases, tactical field care may consist of rapid treatment of wounds with the expectation of a re-engagement of hostile fire at any moment. In some circumstances there may be ample time to render whatever care is available in the field. The time to evacuation may be quite variable from 30 minutes to several hours.

Tactical Field Care

- If a victim of a blast or penetrating injury is found without a pulse, respirations, or other signs of life,
- **Do Not** attempt CPR

- Casualties with altered mental status should be disarmed immediately, both weapons and grenades

Tactical Field Care

Initial assessment consists of

Airway

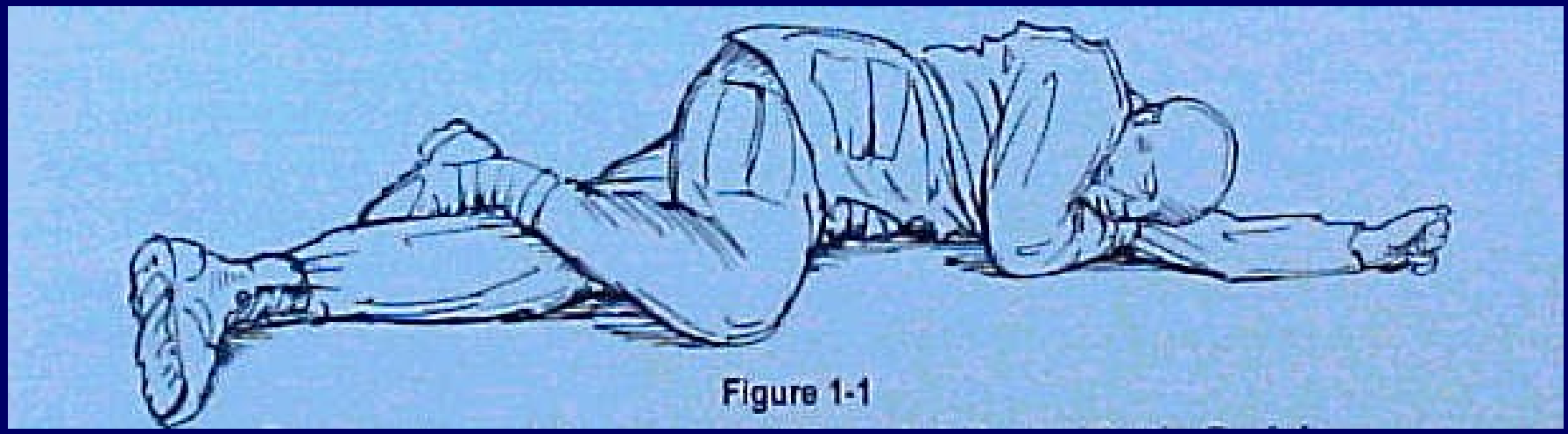
Breathing

Circulation

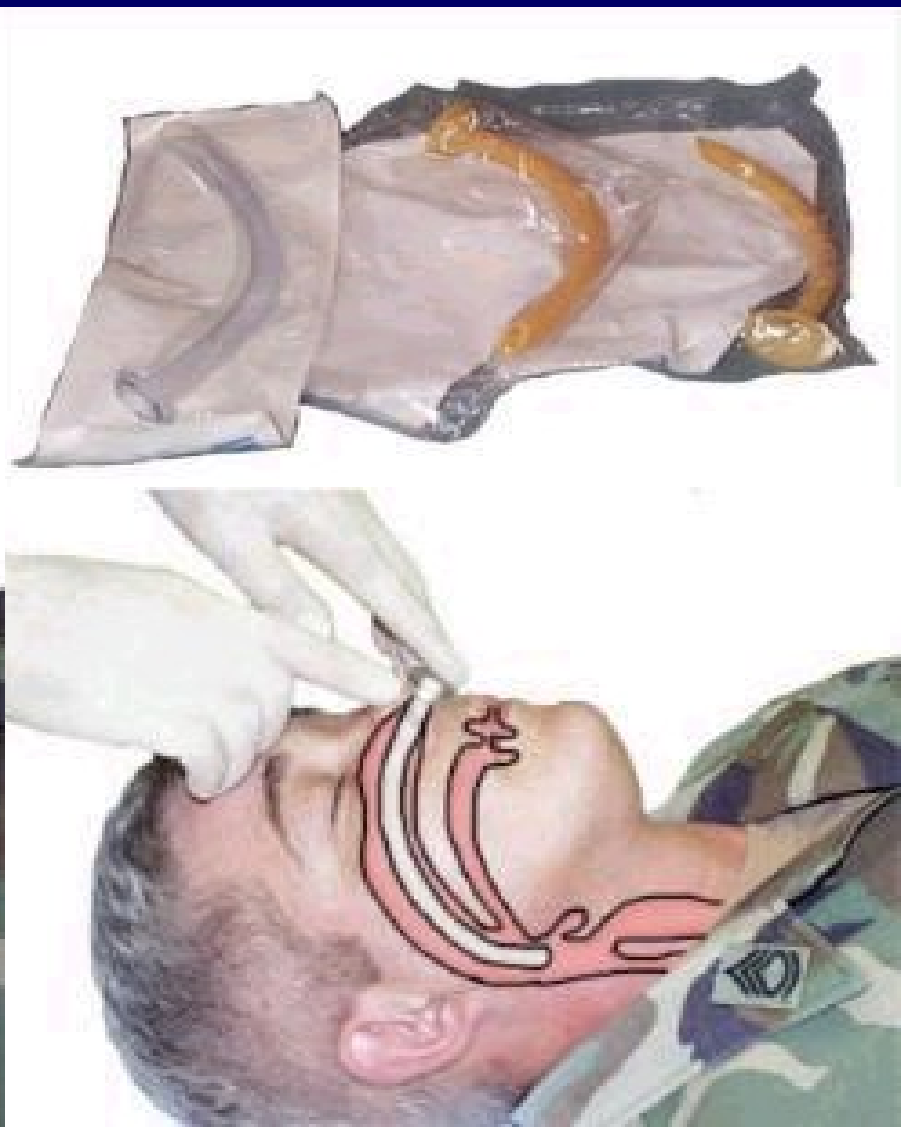
Tactical Field Care

Airway

- Open the airway with a jaw thrust maneuver, if unconscious insert a nasopharyngeal airway or Combitube, and place the casualty in the recovery position



Nasopharyngeal Airway



Tactical Field Care

- Airway

- If the casualty is unconscious with an obstructed airway, perform a surgical cricothyroidotomy

Cricothyroidotomy

Operational Medicine

Tactical Field Care

- Airway
- Oxygen is usually not available in this phase of care

Tactical Field Care

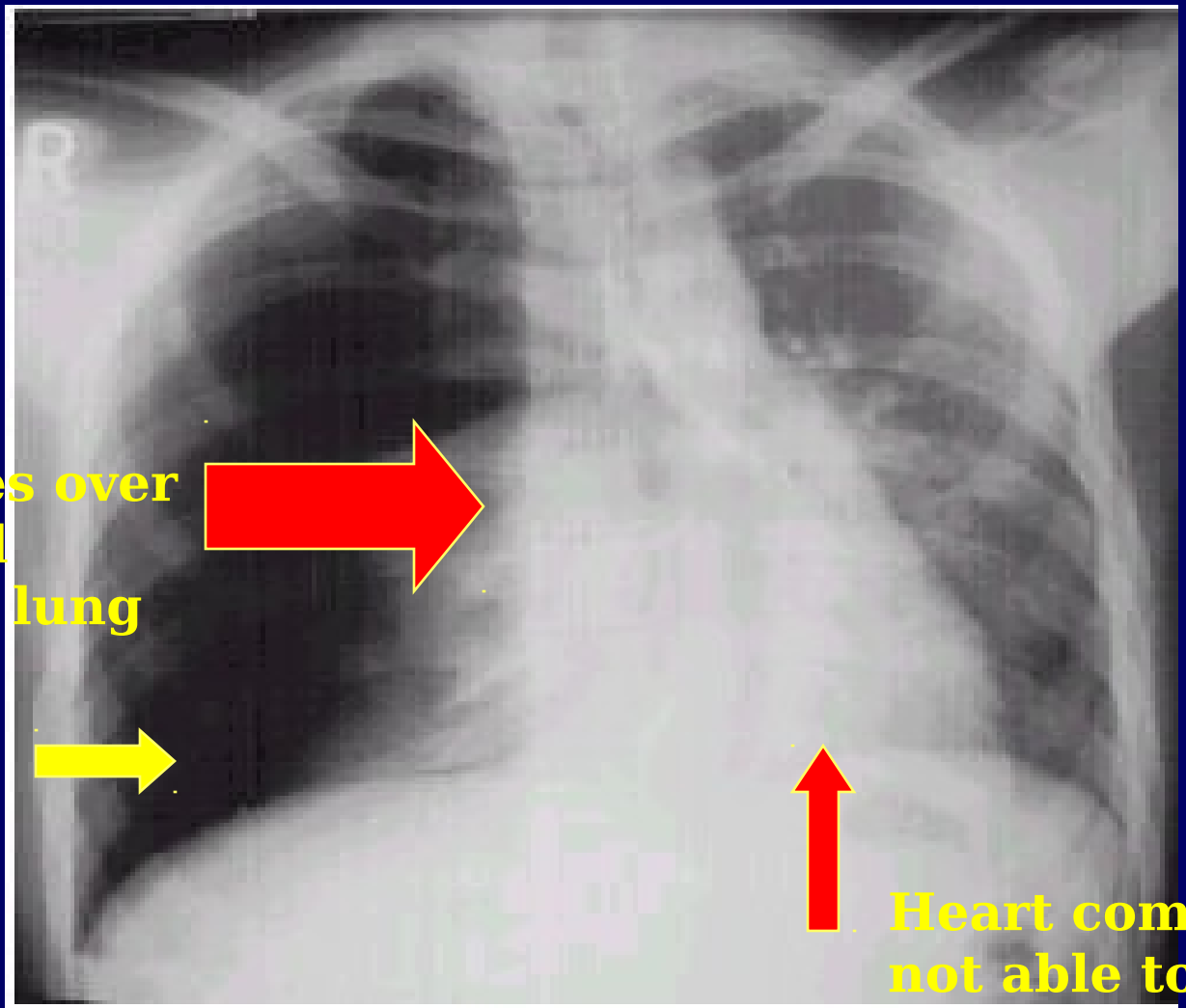
- Breathing
- Traumatic chest wall defects should be closed with an occlusive dressing without regard to venting one side of the dressing or use an “Asherman Chest Seal®”. Place the casualty in the sitting position if possible.

"Asherman Chest Seal"

Tactical Field Care
Breathing

- Progressive respiratory distress secondary to a unilateral penetrating chest trauma should be considered a tension pneumothorax and decompressed with a 14 gauge needle
- Tension pneumothorax is the 2nd leading cause of preventable death on the battlefield

Tension Pneumothorax



Air pushes over heart and collapses lung

Air outside lung from wound

Heart compressed not able to pump

Needle Chest Decompression

Tactical Field Care

- Bleeding

- Any bleeding site not previously controlled should now be addressed. Only the absolute minimum of clothing should be removed.

Tactical Field Care

- Bleeding cont'd
- Significant bleeding should be controlled using a tourniquet as described previously.
- Once the tactical situation permits, consideration should be given to loosening the tourniquet and using direct pressure or hemostatic dressings (HemCon®) or hemostatic powder (QuikClot®) to control any additional hemorrhage

Chitosan Hemostatic Dressing

- Hold the foil over-pouch so that instructions can be read. Identify unsealed edges at the top of the over-pouch

Chitosan Hemostatic Dressing

- Peel open over-pouch by pulling the unsealed edges apart

Chitosan Hemostatic Dressing

- Trap dressing between bottom foil and non-absorbable green/black polyester backing with your hand and thumb

Chitosan Hemostatic Dressing

- Hold dressing by the non-absorbable polyester backing and discard the foil over-pouch. Hands must be dry to prevent dressing from sticking to hands.

Chitosan Hemostatic Dressing

Chitosan Hemostatic Dressing

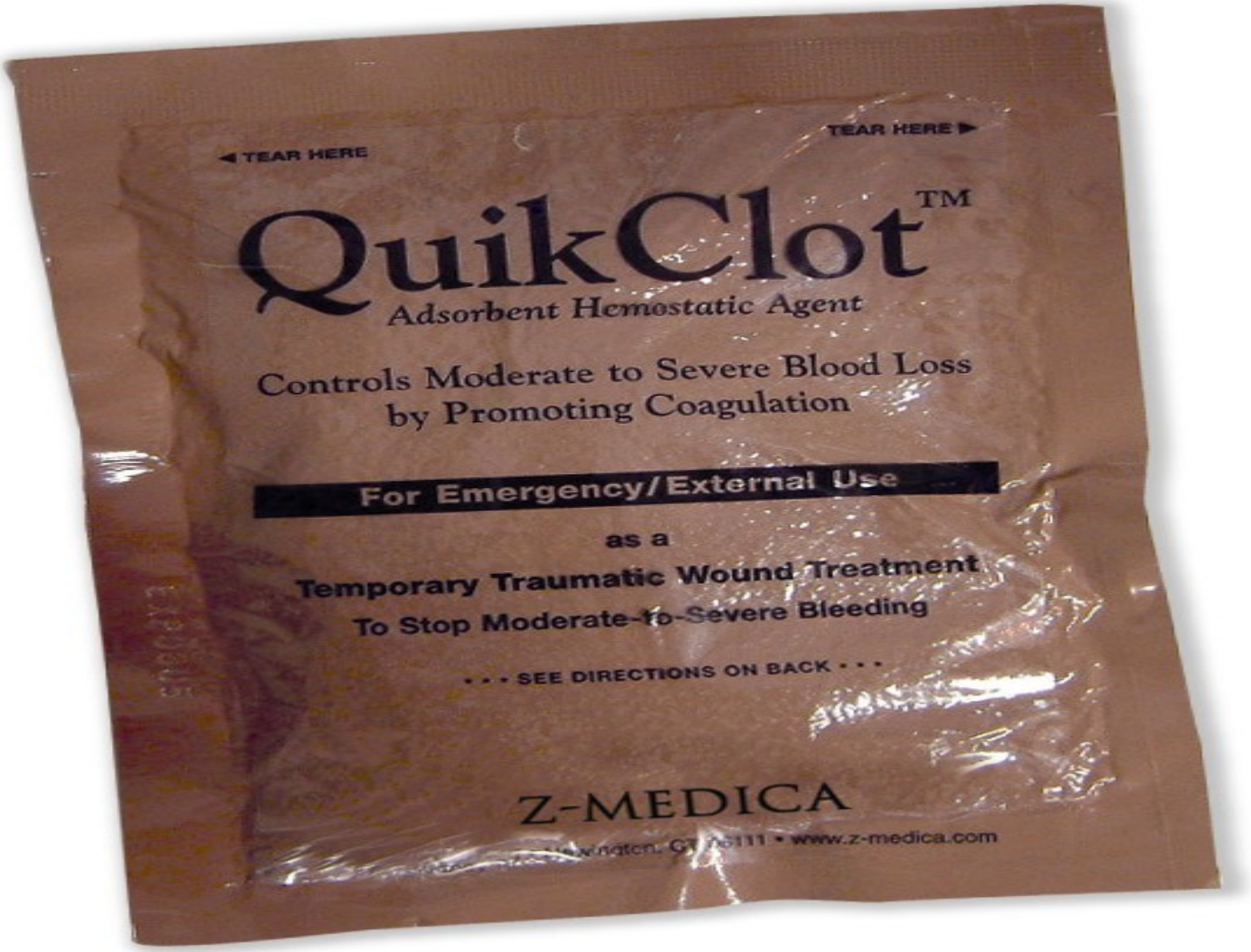
- Place the light colored sponge portion of the dressing directly to the wound area with the most severe bleeding. Apply pressure for 2 minutes or until the dressing adheres and bleeding stops. Once applied and in contact with the blood and other fluids, the dressing **CANNOT** be repositioned.
- A new dressing should be applied to other exposed bleeding sites Each new dressing must be in contact with tissue where bleeding is heaviest. Care must be taken to avoid contact with the patient's eyes.

Chitosan Hemostatic Dressing

- If dressing is not effective in stopping bleeding after 4 minutes, remove original and apply a new dressing. Additional dressings cannot be applied over ineffective dressing
- Apply a battle dressing/bandage to secure hemostatic dressing in place
- Hemostatic dressings should only be removed by responsible persons after evacuation to the next level of care

Chitosan HCD

Porcine Abdominal Aorta Punch


◄ TEAR HERE
TEAR HERE ►
QuikClot™
Adsorbent Hemostatic Agent
Controls Moderate to Severe Blood Loss
by Promoting Coagulation
For Emergency/External Use
as a
Temporary Traumatic Wound Treatment
To Stop Moderate-to-Severe Bleeding
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Tactical Field Care

- IV
- IV access must be gained next. The use of a single 18 gauge catheter is recommended, because of the ease of starting and also helps to conserve supplies.
- A Heparin or saline lock-type access tubing should be used unless the patient needs immediate resuscitation.

Saline Lock

Saline Lock

Saline Lock

Saline Lock

Saline Lock

Tactical Field Care

- IV
- Medics should insure the IV is not started distal to a significant wound.

- If unable to start an IV consideration should be given to starting a sternal I/O line to provide fluids

Tactical Field Care

- Fluids
- 1000ml of Ringers Lactate (2.4lbs) will expand the intravascular volume by 250ml within 1 hour
- 500ml of 6% Hetastarch (trade name Hextend®, weighs 1.3lbs) will expand the intravascular volume by 800ml within 1 hour, and will sustain this expansion for 8 hours

Tactical Field Care

- Fluids
- Algorithm for fluid resuscitation

- BP verses palpable radial pulse and mentation

- Superficial wounds (>50% injured); no immediate IV fluids needed. Oral fluids should be encouraged.

Tactical Field Care

- Fluids
- Any significant extremity or truncal wound (neck, chest, abdomen, pelvis)

- 1. If the soldier is coherent and has a palpable radial pulse, start a saline lock, hold fluids and reevaluate as frequently as the situation permits

Tactical Field Care

- Fluids
- 2. Significant blood loss from any wound, and the soldier has no radial pulse or is not coherent-**STOP THE BLEEDING-** by whatever means available- tourniquet, direct pressure, hemostatic dressings, or hemostatic powder etc. Start 500ml of Hextend®. If mental status improves and radial pulse returns, maintain saline lock and hold fluids

Tactical Field Care

- Fluids

- 3. If no response is seen give an additional 500ml of Hextend® and monitor vital signs. If no response is seen after 1000ml of Hextend®, consider triaging supplies and attention to more salvageable casualties

Tactical Field Care

- Fluids

- 4. Because of coagulation concerns, no casualty should receive more than 1000 ml of Hextend®.

Tactical Field Care

- Wounds
- Dress wounds to prevent further contamination and help hemostasis
  (Emergency Trauma Dressing®)
- Check for additional wounds (exit)

Tactical Field Care

Pain Control

- Able to fight
  - Rofecoxib (vioxx®) 50 mg po qd
  - Acetaminophen 1000 mg po q6hr
- Unable to fight
  - Morphine 5 mg IV / IO
  - Phenergan® 25mg IV, IM

Combat Pill Pack

Pain Management and Infection Control
For Combat Casualties

"Just Got Easier To Swallow"

Tactical Field Care

- Pain Control
- Pain control should be achieved by intravenous morphine, if possible
- 1. 5mg IV morphine may be given every 10 minutes until adequate pain control is achieved. If a saline lock is used it should be flushed with 5ml of sterile solution (saline, LR etc.) after morphine administration.

Tactical Field Care

- Pain control

- 2. Insure some visible indication of time and amount of morphine given.
- 3. Soldiers who administer morphine should also be trained in its side effects and in the use of Naloxone

Tactical Field Care

- Pain Control

- Soldiers should avoid aspirin and other nonsteroidal anti-inflammatory medicines while in a combat zone because of detrimental effects on hemostasis.

Tactical Field Care

- Fractures

- Splint fractures as circumstances allow, insuring pulse, motor, and sensory checks before and after splinting

Tactical Field Care

- Antibiotics

- Antibiotics should be considered in any wound sustained on the battlefield.

Tactical Field Care

- Casualties who are awake and alert, Gatifloxacin 400 mg, one tablet Q day with increased fluids
- Casualties who are unconscious, Cefotetan 2gms IV push over 3-5 minutes, may be repeated at 12 hour intervals.
- Personnel with allergies to Fluoroquinolones or Cephalosporins, consider other broad spectrum antibiotics in the planning phase.

Casevac Care

Casevac Care

- At some point in the operation the casualty will be scheduled for evacuation. Time to evacuation may be quite variable from minutes to hours.

Casevac Care

Casevac Care

- There are only minor differences in care when progressing from the Tactical Field Care phase to the Casevac phase.
- 1. Additional medical personnel may accompany the evacuation asset and assist the medic on the ground. This may be important for the following reasons:

Casevac Care

- The medic may be among the casualties
- The medic may be dehydrated, hypothermic, or otherwise debilitated

Casevac Care

- The Evac asset's medical equipment may need to be prepared prior to evacuation.
- There may be multiple casualties that exceed the capability of the medic to care for simultaneously.

Casevac Care

- 2. Additional medical equipment can be brought in with the EVAC asset to augment the equipment the medic already has.

- This equipment may include:

Casevac Care

- Electronic monitoring equipment capable of measuring a patient's blood pressure, pulse, and pulse oximetry.

- Oxygen should be available during this phase

Casevac Care

- Ringers Lactate at a rate of 250ml per hour for patients not in shock should help to reverse dehydration.

- Blood products may be available during this phase of care.

Summary

- How people die in ground combat:

- 31% Penetrating Head Trauma
- 25% Surgically Uncorrectable Torso Trauma
- 10% Potentially Correctable Surgical Trauma

Summary

- 9% Exsanguination from Extremity Wounds 1st
- 7% Mutilating Blast Trauma
- 5% Tension Pneumothorax 2nd
- 1% Airway Problems 3rd
- 12% Died of Wounds (Mostly infections and complications of shock)
- Today < 5 %

Summary

- Three categories of casualties on the battlefield:
- ✓ Soldiers who will do well regardless of what we do for them
- ✓ Soldiers who are going to die regardless of what we do for them
- ✓ Soldiers who will die if we do not do something for them NOW (7-15%)

Summary

"If during the next war you could do only two things, (1) put on a tour-niquet and (2) relieve a tension pneumothorax then you can prob-ably save between 70 and 90 per-cent of all the preventable deaths on the battlefield."

COL Ron Bellamy

Summary

- Medical care during combat differs significantly from the care provided in the civilian community. New concepts in hemorrhage control, fluid resuscitation, analgesia, and antibiotics are important steps in providing the best possible care to our combat soldiers.

Summary

- These timely interventions will be the mainstay in decreasing the number of combat fatalities on the battlefield.

National Stock Numbers

- One handed tourniquet 6515-01-504-0827
- Hextend® Fluid 6505-01-498-8636
- FAST 1® 6515-01-453-0960
- Emergency Trauma Dressing® 6510-01-492-2275
- HemCon Chitosan Dressing® 6510-01-502-6938
- Sked Litter® 6530-01-260-1222
- Talon II Litter® 6530-01-452-1651

QUESTIONS ??